

**Logan Wash Mine Annual Report**

**Permit No. M-1977-424**

**Table 1. Reclamation Status at Logan Wash Mine, March 2021**

Area Number (Exhibit E & F)	Name	Approved Area	Actual Disturbed Area	Acres Reclaimed (acres/year)	Acres Released (acres/year)
1	Mine Dump <sup>a</sup>	30.00	13.36	13.36/2004	NR
2	Upper Mine Bench	3.00	0.74	0.74/2005	NR
3	Lower Mine Bench	3.80	2.10	2.10/2003 <sup>b</sup>	NR
4	Research Mine Bench and Dump	5.00	4.26	4.26/2004	NR
5	Old Surface Process Facility	3.00	1.82	1.82/<1986	1.82/1986
6	Two Overflow Ponds	2.00	2.86	2.86/<1986	2.86/2006
7	Equipment & Parts Storage	2.55	0.67	0.67/<1986	0.67/1986
8	Ventilation Fan Site	1.30	0.41	0.41/1986	0.41/2006
9	Power Substation	0.75	0.75	0.75/1986	0.75/2006
10	Helo Pad	1.00	0.24	0.24/-	NR <sup>c</sup>
11	Guard Gate Area	5.00	8.30	Not to be reclaimed	Transferred/1983 <sup>d</sup>
12	Met Tower	1.00	0.80	0.80/<1982	0.80/2006
13	Misc. Access Roads <sup>e</sup>	11.5	15.58	11.78/2005	8.12/1986
14	Oil Transfer Pipeline	0.5	0.5	0.5/<1998	0.5/2006
15	Heater/Treater	3.00	2.96	2.96/1986	2.96/2006
16	Microwave Tower	1.00	0.11	0.11/<1998	0.11/2006

Area Number (Exhibit E & F)	Name	Approved Area	Actual Disturbed Area	Acres Reclaimed (acres/year)	Acres Released (acres/year)
17	Exhaust Stack	3.00	3.00	3.00	3.00/2006
18	Logan Wash Road	55.55	53.43	Not to be reclaimed <sup>f</sup>	---
19	Surface Process Control	1.00	1.0	1.0/<1998	1.0/2006
20	Top Soil Storage	0.5	0.25	0.25/<1998	0.5/2006
21	Berm Material	0.25	0.33	0.25/<1986	0.33/1986
22	Heater Treater Meteorological Station <sup>d</sup>	0.18-	0.18	0.18/<1986	0.18./1986
B1-B10	Logan Wash Road Realign	6.0	6.0	6.0/<1986	~5.0/1986
New	Soil Barrow Area (2005)	2.0	0.65	0.65/2005	0.65/2006
23	Evaporation Pond and Pipeline	14.87	14.87	5.07/<1986	NR
Total		157.75	135.17	59.84	29.41

Table 1 Notes: <sup>a</sup>The Mine Dump area is to be reclaimed by establishing “vegetated islands”; the entire acreage will not be vegetated. <sup>b</sup>Conducted hydromulch test on Lower Bench; <sup>c</sup> Area 10 was excavated for a pond for the landowner and is under reclamation; <sup>d</sup>Area 11 transferred to Chevron, not to be reclaimed; <sup>e</sup> See Table 2 for description of access roads, release is assumed; <sup>f</sup> The original reclamation plan named the Logan Wash Road as disturbed acreage, but noted that it would not be reclaimed because the road serves as a main access road to BLM and private lands; NR = Not Released

**Table 2. Reclamation Status of Miscellaneous Access Roads, March 2021**

<b>Area</b>	<b>Estimated Disturbed Area</b>	<b>Acres Reclaimed (as of March 2015)</b>	<b>Acres Remaining to be Reclaimed</b>
Mine Bench and Portal <sup>a</sup>	7.46	3.66	3.8
Old Surface Process	1.51	1.51	0.0
New Surface Process	2.17	2.17	0.0
Heater/Treater <sup>b</sup>	1.36	1.36	1.36
Beyond Microwave	2.33	2.33	0.0
Vicinity of the Microwave	0.75	0.75	0.0
<b>Total</b>	<b>15.58</b>	<b>11.78</b>	<b>5.16<sup>a</sup></b>

<sup>a</sup> Based on Upper Access Road and Lower Bench Road, and Upper Bench Road map measurements

<sup>b</sup> Lower Access Road was under reclamation but unsuccessful due to cattle foraging. Road is still used to access Well LWCW-1A.

**Table 3. Well Abandonment Schedule, March 2021**

<b>Monitoring Well ID</b>	<b>Abandonment Date</b>	<b>Status</b>
LW-22A	TBD	Monitoring Suspended
LW-32	TBD	To be abandoned
LW-45	TBD	To be abandoned
LW-102	2007	Cement plugged
LW-103	TBD	To be abandoned
LW-104	2007	Cement plugged
LW-108	2005	Cement plugged
LW-112	2005	Cement plugged
LW-116	TBD	To be abandoned
LW-242	2005	Cement plugged
LW-243	2007	Cement plugged
LWCW-1A	TBD	Monitoring

Notes: TBD: to be determined

**Table 4. Summary of Acreage Released from Warranty at Logan Wash Mine**

Area	Approximate Acreage	Approximate Release Date	Comment
5, 7, 21, 22	3.00	1986 or earlier	
6, 8, 9, 12, 14, 15, 16, 17, 19, 20	12.64	1986	
13	8.12	1986 (partial)	Misc. access roads
11	NA	NA	Transferred to Chevron
18	NA	NA	Will not be reclaimed
A5, A7, A21, A22	Unknown	1986 or earlier	Not located on historical maps
B1, B4, B6, B9, B10, B11	~5.0	1986 or earlier	Mostly road spurs, turn outs
23	5.1	Prior to 1985	Based on 1985 Annual Report
Estimated Total	31.3		

**Table 5. Summary of Areas Under Reclamation at Logan Wash Mine**

Area	Name	Estimated Acres	Revegetation Date
1*	Upper & Lower Mine Dump Faces	13.4	2003-2005
2*	Upper Mine Bench	0.7	2004-2005
3	Lower Mine Bench	2.1	2004 - Natural revegetation
4*	Research Mine Bench & Dump	4.3	2003-2004
10*	Helo Pad	0.2	Pre-2000
Portions of Area 13	Miscellaneous Access Roads	0.4 + 1.4	2004
---*	Soil Barrow Area	0.7	2004
Total		23.2	

\* = Area anticipated for request for release in 2021

**Table 6. Summary of Areas Not Under Reclamation at Logan Wash Mine**

Area	Name	Estimated Acres
3	Lower Bench	2.1
13	Lower Bench Road	1.5
13	Upper Access Road	4.8
13	Evap. Pond Access Road	1.3
23	Evaporation Pond & Pipeline	10.2
13	Lower Access Road	1.4
Total		21.3

**Table 7. Summary of Reclamation Status at Logan Wash Mine**

<b>Acreage Status Category</b>	<b>Estimated Acreage</b>
Total original disturbed/used acres	135.2
Acres not to be reclaimed (Logan Wash Road, Chevron land)	61.7
Total acres requiring reclamation	73.5
Total acres released to date	31.3
Total new disturbed acres this reporting period	0.0
Total new acreage under reclamation this reporting period	0.0
Total acres under reclamation to date	23.2
Total estimated acres not currently under reclamation	21.3
Total estimated reclaimed acres needing release	44.5

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**Table 8. Logan Wash Mine Site Monitoring Results, March 2020 to March 2021**

Date	LW-002 <sup>1</sup> Manometer (inches)	LW-001 <sup>2</sup> (L-1 Portal) (gpm)	Upper Manhole <sup>3</sup> (gpm)	Lower Manhole <sup>4</sup> (gpm)	Evaporation/Settling Pond Specific Conductivity (uS/cm)	Comment
01/17/20	NM	NM	2.51	2.20	Frozen	Conduct pond monitoring. Unable to access mine bench by vehicle.
3/10/20	NM	NM	2.07	2.10	22049/9234	Conduct pond monitoring. Unable to access mine bench by vehicle.
4/15/20	0.0	0.72	1.71	2.11	22259/9647	Conduct mine and pond monitoring. Download weather station; launch rain gauge
5/15/20	NM	NM	1.97	2.06	40324/9488	Conduct mine and pond monitoring. Purge well LWCW-1A.
5/26/20	NM	0.58	2.20	No Flow	NM	Semi-annual sampling of LW-001, LW-Retort, LW-003; Lower Manhole not flowing, retort pipeline plugged at Manhole no. 10 on road and spilling to bar ditch.
5/17/20	NM	NM	NM	4.61	NM	Checking for flow at Lower Manhole after pipeline plug removed and retort water turned on.
5/28/20	NM	NM	NM	3.95	NM	Checking for flow at Lower Manhole after pipeline plug removed and retort water turned on.
6/4/20	NM	NM	NM	2.12	NM	Conduct mine and pond monitoring. Semi-annual sampling of LWCW-1A.
6/10/20	NM	NM	NM	2.45	NM	Checking Lower Manhole flow.
6/18/20	NM	NM	NM	NM	NM	DRMS Inspection of retort spill
7/1/20	NM	0.56	NM	NM	NM	State (CPW-CNAP) P. debilis survey.
7/17/20	0.0	0.93	2.02	2.16	140186/10861	Conduct mine and pond monitoring. Download rain gauge; weather station.
8/12/20	0.0	0.49	1.91	2.19	142702/10419	Conduct mine and pond monitoring.
9/17/20	0.0	0.49	2.00	2.06	89875/9735	Conduct mine and pond monitoring. Download weather station; rain gauge
9/30/20	NM	MN	NM	NM	NM	Purged well LWCW-1A
10/7/20	NM	0.52	NM	2.39	NM	Conduct mine and pond monitoring.
10/14/20	0.0	0.51	1.72	1.98	100505/10200	Conduct mine and pond monitoring. Sumps dry
11/12/20	0.0	0.52	1.93	2.13	64317/9399	Conduct pond monitoring. Download rain gauge and weather station
1/30/21	0.0	0.51	1.98	2.44	4193/9199	Conduct pond monitoring. Hiked through snow to Lower Bench. Download weather station; flow meter. Pond sumps dry.
3/3/21	0.0	0.49	1.85	2.65	33749/9047	Conduct mine and pond monitoring. Sumps dry
3/18/21	NM	MN	NM	NM	NM	Settling Pond sump dry

Table 8 Notes: LW-002 discharge originates at the Research Mine portal, the manometer measures head behind a concrete dam inside the sealed adit.

<sup>2</sup> LW-001 discharge originates at the L-1 portal of Logan Wash Mine and during the reporting period discharged into the Infiltration Trench. All measurements recorded by electronic flowmeter display.

<sup>3</sup> Upper Manhole is located on Retort Water Pipeline in Logan Wash approximately 3000 ft down drainage of the Lower Dump.

<sup>4</sup> Lower Manhole is located on Retort Water Pipeline immediately north of Evaporation Pond.

NM = not measured